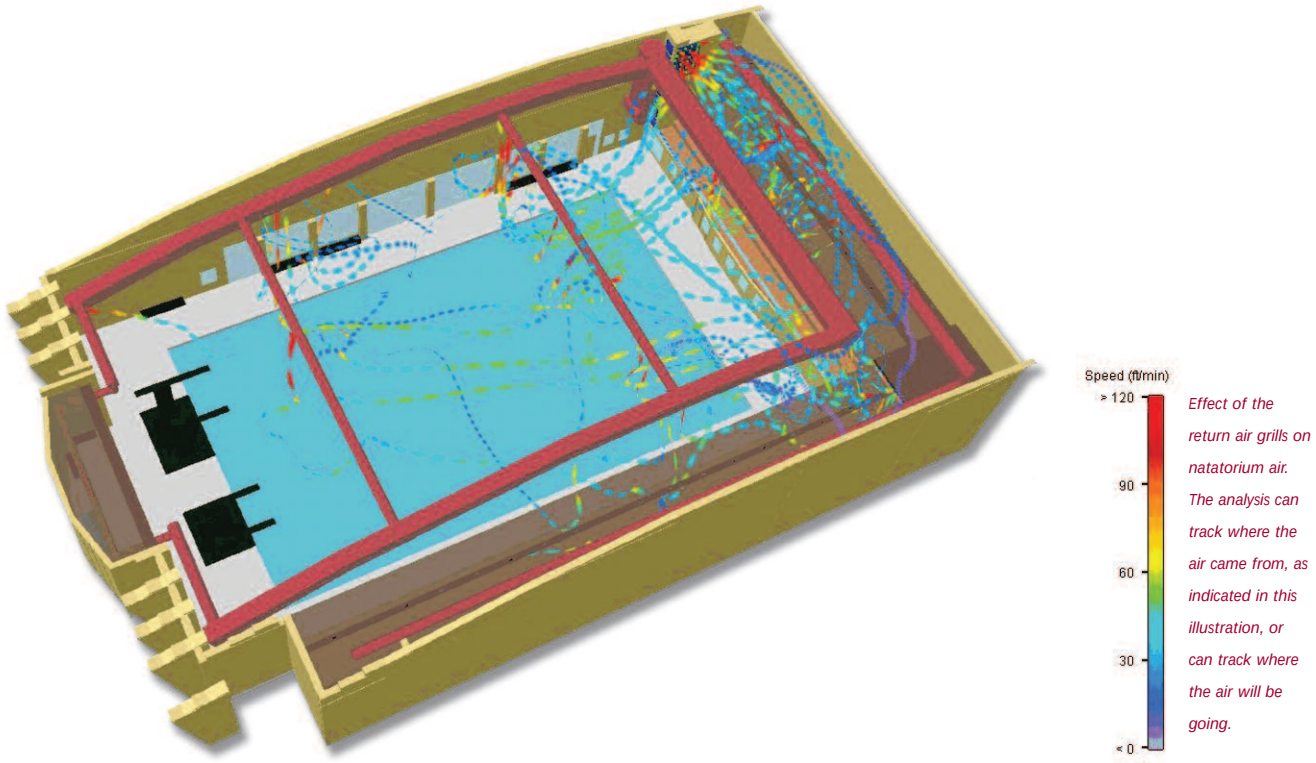
CASE STUDY

Dectron

*AIRE*-TECH-CHEK™ Service

# Dectron's *AIRE*-TECH-CHEK™ Service Revolutionizes HVAC Pool Industry




*Effect of the return air grills on natatorium air. The analysis can track where the air came from, as indicated in this illustration, or can track where the air will be going.*

## World's First Natatorium CFD Analysis Helps Tame Wild HVAC Design Variables of Huge High School Indoor Pool.

**Holland, Michigan. —** Natatoriums can be considered one of the HVAC industry's most challenging design applications, due mainly to their huge evaporative rates. Consequently, the world's first natatorium Computational Fluid Dynamics (CFD) analysis service was an extremely valuable and welcome tool available when designing the huge 16,500-square-foot natatorium of East Kentwood High School, in Grand Rapids, Mich.

Huge natatoriums, such as East Kentwood's, are never a sure bet because of the multitude of variables that must be analyzed and evaluated to arrive at a final design concept. Accordingly, consulting engineers are sometimes victimized by factors beyond their control, such as variances in ductwork and fitting manufacturers' specifications. Also, field airflow modifications due to architectural or structural changes, not to mention start-up and testing/balancing problems, can change original concepts once the system is finally in operation.

Add all these concerns to a 9,650-square-foot pool, expected to produce a huge humidity load of over 550-lb./hr., and the high school gladly accepted the offer to be the first CFD analyzed natatorium customer using the *AIRE*-TECH-CHEK™ Service – the HVAC industry's first natatorium airflow modeling consulting service, developed by heat recovery dehumidifier manufacturer Dectron Inc., Roswell, Ga.

Although an airflow design might look good on paper, application variables, such as airflow over the pool surface

and windows, drafts, temperature gradients, heating/cooling seasons, etc., can have a serious effect on airflow, which is critical in natatorium comfort.

Once the natatorium was designed, as much data as possible was collected, ranging from diffuser dimensions, duct sizes, window performance data, airflow velocities, return air grill sizes, and dozens of other product specifications. This data and the natatorium's final construction drawings were then submitted to Dectron's CFD analysis department, which built the 3D space and created the simulation.

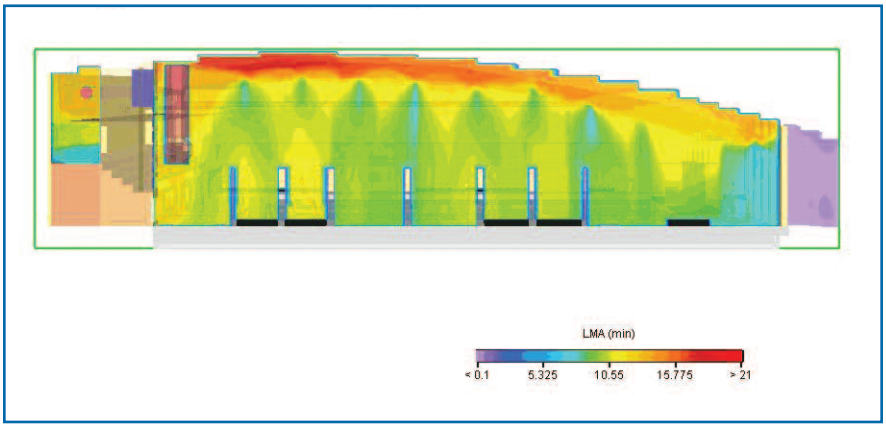
The result was a PowerPoint presentation demonstrating animated views of the airflow over the pool surface and windows, as well as concentrations, temperature, and relative humidity variations within the natatorium's ventilation system. Overall, airflow effectiveness can be viewed using the LMA (Local Mean Age of Air) and LACI (Local Air Change Index) output variables. Additionally, the analysis also allows for the impact of short and long-term ventilation system failure on the conditions within the natatorium, plus the optimization of the diffuser location and operational performance. Any post-analysis changes can be quickly evaluated against relevant performance data.

The *AIRE*-TECH-CHEK™ Service indicated there would be condensation problems near the top of the glass because of the angle of the supply diffusers. As a result, changes were made so the client had the assurance that the HVAC system would perform as designed and that air comfort in the space would be as anticipated.

An engineer designing a natatorium could benefit greatly from Dectron's *AIRE*-TECH-CHEK™ Service CFD analysis as an invaluable design tool. It could also be an inestimable sales tool in the engineering marketing process by proving that ductwork location and diffuser orientation are more functional than a competing firm's design that was not 3D-modeled. The *AIRE*-TECH-CHEK™ Service also becomes another integral component of POOL PERFECT, a new single-source responsibility program where engineers or facility owners can request Dectron's participation in the total design/operation of a natatorium from equipment selection to after-market real-time monitoring and operational energy analysis.

Dectron Inc., an ISO-Certified company, is a global HVAC industry leader. For three decades, Dectron's highly-skilled engineers and technical staff have been designing and manufacturing innovative, state-of-the-art DRY-O-TRON® dehumidification equipment that use leading-edge technology to recycle energy, conserve pool water, and CHLORAGUARD® filter natatoriums. Dectron Inc.'s DRY-O-TRON® line of products encompasses an extensive array of custom and semi-custom systems for industrial, commercial, and residential applications.

***An engineer designing a natatorium could benefit greatly from Dectron's AIRE-TECH-CHEK™ Service's CFD analysis as an invaluable design tool.***




*A side view of the Local Mean Age of Air (LMA).*

**USA**
10898 Crabapple Road
Suite 103
Roswell, Georgia 30075
Tel.: (770) 649-0102
**1 800 676 2566**
Fax: (770) 649-0243

**CANADA**
3999 Cote Vertu
Montreal, Quebec
Canada H4R 1R2
Tel.: (1) 514 336-3330
**1 888 DECTRON**
Fax: (1) 514 337-3336

**www.dectron.com**

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